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EXAMINER	
SENFI, BEHROOZ M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/716,222	LINZER, ELLIOT N.	
	Examiner	Art Unit	
	Behrooz Senfi	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).. Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :2/8/05,8/23/05,10/18/05,4/25/06.

DETAILED ACTION

Drawings

1. The drawings were received on 11/18/2003. These drawings are accepted.

Claim Objections

2. Claims 16 and 17 are objected to because of the following informalities:

Regarding claim 16, the claim limitations "allocating a second picture from the video signal among the picture segments" as recited in the claim (claim 16, lines 3 – 4) is confusing. Because it is not clear where the second picture from the video signal among the picture segment are allocated? Examiner suggestion; The claim language can be improved by adding, for example "allocating a memory space to a second picture from the video signal among the picture segments" or "mapping a second picture from the video signal among the picture segments", to be consistent with the scope of the claims. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 11, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Hoogenboom et al. (US 5,675,387).

Regarding claim 11, Hoogenboom '387 discloses, mapping a first picture from the video signal among a plurality of picture segments (please see; fig. 2, layout of

mapping of the frame/picture among a plurality of picture segments "e.g. tiles" in the memory unit "DRAM" from a video signal 10) and generating a list associated each of the picture segments to a plurality of physical pages in a memory (please see; figs. 1 – 4 memory manager 30 addressing DRAM/generating DRAM addresses for each of the picture segments as shown in figs. 3 – 4 "e.g. 1F0 – 1FF" consider as a list to a plurality of physical pages "e.g. such as memory rows, as shown in fig. 5 of Hoogenboom") and storing the first picture among the physical pages according to the list and the mapping (please see, figs. 1 and 3 - 4, memory unit 22, such as DRAM 22, and the mapping of the picture data, where the memory unit 22 is used for storing the first picture among the physical pages "e.g. memory rows" according to the list "e.g. generated address by the memory manager 30, illustrated in figs. 3 – 4, such as 1F0 – 1FF and the mapping, e.g. mapping layout used for storing picture data as shown in figs. 2 - 4 of Hoogenboom).

Regarding claim 19, Hoogenboom '387 discloses, wherein each of the picture segments is mapped to at least two of the physical pages in each of a plurality of banks in the memory (please see; figs. 2 and 5, col. 8, lines 31 – 36 and col. 9, lines 15 – 20, where indicates that video frame/picture is divided into 165 tiles, and illustrates picture segments "e.g. tiles" mapping, to at least two of the physical pages "e.g. each row is equal to one tile and one page is equal to one row" in memory banks).

Regarding claim 20, Hoogenboom '387 discloses, an device comprising; means for mapping a first picture from the video signal among a plurality of picture segments (please see; fig. 2, layout of mapping of the frame/picture among a plurality of picture

segments "e.g. tiles" in the memory unit "DRAM" from a video signal 10), means for generating a list associating each of the picture segments to a plurality of physical pages in a memory (please see; figs. 1 – 4 memory manager 30 addressing DRAM/generating DRAM addresses for each of the picture segments as shown in figs. 3 – 4 "e.g. 1F0 – 1FF" consider as a list to a plurality of physical pages "e.g. such as memory rows, as shown in fig. 5 of Hoogenboom") and means for storing the first picture among the physical pages according to the list and the mapping (please see, figs. 1 and 3 - 4, memory unit 22, such as DRAM 22, and the mapping of the picture data, where the memory unit 22 is used for storing the first picture among the physical pages "e.g. memory rows" according to the list "e.g. generated address by the memory manager 30, illustrated in figs. 3 – 4, such as 1F0 – 1FF and the mapping, e.g. mapping layout used for storing picture data as shown in figs. 2 - 4 of Hoogenboom).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1 – 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoogenboom et al. (US 5,675,387) in view of Howe (US 5,900,865).

Regarding claim 1, Hoogenboom '387 teaches, a device comprising; a memory Manager (please see, fig. 1, memory manager 30) configured to map a first picture from a video signal among a plurality of picture segments (please see; figs. 2 - 4, layout of

mapping of the frame/picture among a plurality of picture segments "e.g. picture segments 74, 75, 77 and 79, tiles as shown in figs 2 - 5" in the memory unit 22 from a video signal 10) and generate a list "e.g. addresses" associated each of the picture segments to a plurality of physical pages in a memory (please see; figs. 1 – 5 memory manager 30 addressing DRAM/generating DRAM addresses "e.g. list" for each of the picture segments as shown in figs. 3 – 4 "e.g. block 1 with associated address 1F0 – 1F3" to a plurality of physical pages "e.g. fig. 1 shows the physical pages of memory 22 and also fig. 5 shows one page + one Row of memory) and a memory access unit configured to store the first picture among the physical pages according to the list and the mapping (please see, figs. 1 and 3 - 4, memory unit 22, such as DRAM 22, and the mapping of the picture data, where the memory unit 22 is used for storing the first picture among the physical pages "e.g. memory rows" according to the list "e.g. generated address by the memory manager 30, illustrated in figs. 3 – 4, such as 1F0 – 1FF and the mapping, e.g. mapping layout used for storing picture data as shown in figs. 2 - 4 of Hoogenboom).

Note: A direct memory access unit as specifies in the claim; is a memory unit to store picture data among physical pages, as defined in the claim. In view of this, Hoogenboom teaches a memory unit 22 "such as DRAM" which is used for storing the picture data among the physical pages (e.g. figs. 1 – 5, shows the layout of storing the picture data among the physical pages).

Hoogenboom does not explicitly states, direct memory access unit "DMA", as recited in the claim.

However, Howe '865 clearly teaches the use of direct memory access unit "e.g. fig. 1a, DMA106" in image processing (please see; fig. 1a, DMA 106, col. 7, lines 2 – 11 and col. 8, lines 57 – 67 of Howe).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the video decompression processing of Hoogenboom in accordance with the teaching of Howe by incorporating a direct memory access unit "DMA", which allows an automatic fetching of an entire reference picture area, while crossing the minimal number of DRAM page boundaries, as suggested by Howe (i.e. col. 4, lines 20 – 24).

Regarding claim 2, the combination of Hoogenboom and Howe teaches, further comprising a mapping memory configured to transfer the list from the memory manager to the direct memory access unit (please see; fig. 1 - 3, where the memory manager 30, transfer the list "e.g. address, as shown in fig. 1" to the memory unit 22).

Regarding claim 3, the combination of Hoogenboom and Howe teaches, further comprising a decode processor configured to request the memory manager to allocate space in the memory to store the first picture (please see; Hoogenboom, col. 14, lines 1 – 34, where indicates arbitration of memory requests and handshaking between decoding sub-processes, and further indicates, in the event that the data being decoded is close to overwriting pixel data stored in the DRAM "in other words, not enough space in the memory", the memory manager temporarily suspend the decoding "e.g. to allocate space in the memory" for new pixel data until room/space is available in the memory).

Regarding claim 4, the combination of Hoogenboom and Howe teaches, wherein the memory manager is further configured to transfer an identification value for the first picture to the decode processor after allocating the picture segments (please see; fig. 1, memory manager 30, prediction address generator, col. 4, lines 52 – 64 of Hoogenboom).

Regarding claim 5, the combination of Hoogenboom and Howe teaches, wherein the decode processor is further configured to transfer the identification value to the memory access unit to locate the mapping in the mapping memory (please see; fig. 1, decode processor 20 including memory manager 30 configured to transfer identification value "e.g. address" to memory unit 22 to locate the mapping in the mapping memory, as shown in figs. 2 – 4 of Hoogenboom), and the first picture is divided into a plurality of spatially rectangular regions mapped to an integer number of the physical pages (please see; figs. 2 – 5 of Hoogenboom, where shows picture is divided into a plurality of spatially rectangular regions "such as rectangular regions 74, 75, 77 and 79, shown in fig. 2" and mapped to an integer number of the physical pages "note; one page = one row, as shown in fig. 5 of Hoogenboom") and each group comprising four of the spatially rectangular regions sharing a common corner is mapped among at least two banks of the memory (please see; fig. 2 of Hoogenboom, showing four of rectangular regions 74, 75, 77 and 79 sharing a common corner and are mapped among at least two banks, regions 74 and 77 in one memory bank and regions 75, 79 in another memory bank).

Regarding claim 6, the combination of Hoogenboom and Howe teaches, wherein picture segments is mapped to at least one of the physical page in each of a plurality of

banks in the memory (please see; figs. 2 and 5, layout of mapping of the frame/picture segments "e.g. tiles" to at least one of the physical pages "e.g. fig. 5, one row is equal to one page" in each of a plurality of banks in the memory 22, such as DRAM of Hoogenboom).

Regarding claim 7, Hoogenboom '387 teaches, wherein the picture segments for the first picture are stored in physical pages according to the address ranges (please see, fig. 1, memory unit 22, such as DRAM 22, which is used for storing picture segments "e.g. tiles" for the first picture in physical pages "e.g. rows" according to the address ranges "e.g. figs. 1 – 5, shows the layout of storing the first picture data/segment among the physical pages of the memory unit, according to the addresses generated by the memory manager 30 "such as 1F0 – 1FF" as shown in figs. 3 and 4 of Hoogenboom).

Hoogenboom teaches tiles of chrominance data and corresponding tiles of luminance data are stored separately in the memory (e.g. col. 4, lines 31 – 35). Hoogenboom does not explicitly stated "non-contiguous address" in the memory.

However, Howe '865 teaches non-contiguous DRAM addresses are generated within the DRAM memory (please see; col. 16, lines 27 – 33 of Howe).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the scheme for addressing a dynamic random access memory (DRAM) in the video decompression processor of Hoogenboom in accordance with the teaching of Howe by generating non-contiguous addresses in the DRAM memory "e.g. col. 16, lines 30 – 33", for fetching the entire

reference picture area automatically without firmware interruption and crosses the least number of DRAM boundaries to exploit the speed advantage of the page mode access in DRAMs, as suggested by Howe (i.e. col. 4, lines 20 – 24 of Howe).

Regarding claim 8, the combination of Hoogenboom and Howe teaches, wherein each of the picture segments comprises one group of a plurality of luminance samples and a plurality of chrominance samples from the first picture (please see; *col. 4, lines 31 – 33* of Hoogenboom*) where indicates tiles "e.g. picture segment" of chrominance data and tiles of luminance data separately.*

Regarding claim 9, the combination of Hoogenboom and Howe teaches, wherein the first picture is divided into a plurality of spatially rectangular regions each mapped to an integer number of the physical pages (please see; fig. 2 – 5 of Hoogenboom) where illustrates plurality of spatially rectangular regions/blocks "e.g. such as rectangular regions 74, 75, 77 and 79, shown in fig. 2" mapped to an integer number of the physical pages "e.g. fig. 5, one row is equal to one page" of memory unit 22.

Regarding claim 10, the combination of Hoogenboom and Howe teaches, wherein each group comprising four of the spatially rectangular regions sharing a common corner is mapped among at least two banks of the memory (please see; fig. 2 of Hoogenboom, showing four of rectangular regions 74, 75, 77 and 79 sharing a common corner and are mapped among at least two banks, regions 74 and 77 in one memory bank and regions 75, 79 in another memory bank).

Regarding claim 12, Hoogenboom teaches, a memory unit 22 "such as DRAM" which is used for storing the picture data among the physical pages (e.g. figs. 1 – 5, shows the layout of storing the picture data among the physical pages).

Hoogenboom does not explicitly states "direct memory access operations" as specifies in the claim.

However, Howe '865 clearly teaches direct memory access operations in the image processing (please see; fig. 1a, DMA 106, col. 8, lines 60 – 62 of Howe).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the video decompression processing of Hoogenboom in accordance with the teaching of Howe by using direct memory access operations, which allows an automatic fetching of an entire reference picture area, while crossing the minimal number of DRAM page boundaries, as suggested by Howe (i.e. col. 4, lines 20 – 24).

7. Claims 13 – 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoogenboom et al. (US 5,675,387) in view of Newman et al. (US 5,301,288).

Regarding claim 13, Hoogenboom teaches mapping picture segment allocated to the first picture (please see; figs. 2 - 5, layout of mapping of the picture segments "e.g. tiles" col. 8, lines 26 – 35).

Hoogenboom is silent in regards to explicit of, marking the picture segments as used, as specified in the claim.

Newman '288 in the same field teaches, a picture segment descriptor including a flag "e.g. marker" for indicating whether or not the segment allocated to the image is full "e.g. used" or empty "e.g. not used" (please see; col. 8, lines 1 – 38 of Newman).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the mapping picture segment allocation in video decompression processing of Hoogenboom in accordance with the teaching of Newman by incorporating a flag "e.g. marker" for indicating whether or not the segment allocated to the image is full "e.g. used" or empty "e.g. not used" (please see; col. 8, lines 1 – 38 of Newman), to determine whether the segments contain sufficient address space, which was not previously allocated "e.g. used", as suggested by Newman (i.e. col. 8, lines 36 – 37 of Newman).

Regarding claim 14, Hoogenboom '387 indicates arbitration of memory requests and handshaking between decoding sub-processes, and further indicates, in the event that the data being decoded is close to overwriting pixel data stored in the DRAM "in other words, not enough space in the memory for picture segment", the memory manager temporarily suspend the decoding "e.g. to allocate/free space in the memory" for new pixel data until room/space is available (please see; col. 14, lines 1 – 34).

Hoogenboom does not explicitly states, "deallocating" picture segments from the first picture to free space in the memory.

Newman teaches table and map which are used to free "e.g. deallocate" picture segments to make free space in the memory (please see; col. 3, lines 36 – 51 of Newman).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the video decompression processing of Hoogenboom in accordance with the teaching of Newman by incorporating a table which includes list of records and are used to deallocate picture segments (please see; col. 3, lines 36 – 51) to indicate that space in those segments has been deallocated, which increases the efficiency of data storage and retrieval in the memory, as suggested by Newman (i.e. col. 3, lines 59 - 60).

Regarding claim 15, the combination of Hoogenboom and Newman teaches, marking the picture segments deallocated from the first picture as free (i.e. col. 3, lines 36 – 51 of Newman; as discussed in claim 14 above, indicates table and map used to free "i.e. deallocate" picture segments, and also identify the picture segments as to indicate segments has been deallocated; which is equivalent to "marking" as specifies in the claim, for indicating picture segments deallocated/free space).

Regarding claim 16, Hoogenboom teaches compressed video bit-stream "as shown in fig. 2, layout of picture segments memory mapping of Hoogenboom" inputted via terminal 10 represents video frames/pictures "e.g. first picture, second picture, third picture and so fort from the video bit-stream" in a sequence, thus being inputted via terminal 10 to be process by the processor 20 and mapped one at a time (please see; fig. 2, compressed video bit-stream inputted via terminal 10, col. 1, lines 63 – 64 and col. 8, lines 1 – 13 of Hoogenboom), which reads on the limitations "allocating a second picture from the video signal among the picture segments" as specifies in the claim.

Although, Hoogenboom teaches temporarily suspending the process of new data to make room/space available in the storage, as indicated, in the event that the data being process is close to overwriting pixel data stored in the memory unit 22 "in other words, there is not enough space in the memory unit" circuit will instruct video parser to temporarily suspend the process of new data until room is available in the memory unit (please see; col. 14, lines 1 – 7 of Hoogenboom).

Hoogenboom does not explicitly states "picture segment deallocated" as specifies in the claim.

Newman teaches table and map which are used to free "e.g. deallocate" picture segments to free space in the memory (please see; col. 3, lines 36 – 51 of Newman).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the video decompression processing of Hoogenboom in accordance with the teaching of Newman by incorporating a table which includes list of records and are used to deallocate picture segments (please see; col. 3, lines 36 – 51) to indicate that space in those segments has been deallocated, which increases the efficiency of data storage and retrieval in the memory, as suggested by Newman (i.e. col. 3, lines 59 - 60).

Regarding claim 18, Hoogenboom teaches mapping picture segment allocated to the first picture (please see; figs. 2 - 5, layout of mapping of the picture segments "e.g. tiles", col. 8, lines 26 – 35).

Hoogenboom is silent in regards to explicit of "generating a value identifying" which of the picture segments are mapped to the first picture.

Note: The claimed value identifying which of the picture segments are mapped to the first picture; is equivalent to indicating whether or not the picture segment is allocated/used "e.g. mapped" or not.

Newman '288 in the same field teaches, generating a picture segment descriptor including a flag "e.g. value/marker" for indicating whether or not the segment allocated to the image is full "e.g. used/allocated" or empty "e.g. not used/not allocated" (please see; col. 8, lines 1 – 38 of Newman).

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the mapping picture segment allocation in video decompression processing of Hoogenboom in accordance with the teaching of Newman by using a picture segment descriptor for identifying/indicating which of the picture segment are mapped/used (please see; col. 8, lines 1 – 38 of Newman), for determining whether the segments contain sufficient address space, which was not previously allocated "e.g. used", as suggested by Newman (i.e. col. 8, lines 36 – 37).

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoogenboom et al. (US 5,675,387) in view of Newman et al. (US 5,301,288) further in view of Bateman (US 2004/0075750).

Regarding claim 17, the combination of Hoogenboom and Newman teaches, input compressed bit-stream via terminal 10 of Hoogenboom, represents video frames/pictures "e.g. first picture, second picture, third picture and so fort from the video bit-stream" in a sequence and further teaches the memory manager temporarily

suspend the decoding "e.g. to allocate/free space in the memory" for new pixel data until room/space is available, as discussed in the above action (please see; Hoogenboom, col. 14, lines 1 – 34).

The combination of Hoogenboom and Newman is silent in regards to explicit of "first picture has a different size than the second picture" as specifies in the claim.

Batman in the same field of memory management (i.e. figs. 4 – 5 and page 3, paragraphs 0033, 0036 and page 5, paragraph 0055) indicates determine the amount of memory available for newly captured image and resizing "e.g. change sizes of the image, image having different size" the images to reduce the memory occupied by the captured images "e.g. free some space by resizing the images").

In view of the above, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to combine the teaching of Hoogenboom in accordance with the teaching Batman by checking the amount of memory available for the new image "e.g. different size" to be stored, by rescaling image/data if necessary as the memory gets filled up, as suggested by Bateman (i.e. page 1, paragraph 0010, lines 3 – 4).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Behrooz Senfi whose telephone number is 571-272-7339. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Behrooz Senfi
Examiner
Art Unit 2621